MODIS
SCIENCE DATA SUPPORT TEAM
PRESENTATION

September 11, 1992

AGENDA

Page

ACTION ITEMS:

04/24/92 [Lloyd Carpenter & Team] Develop a staffing plan for the accomplishment of the tasks shown on the schedule. (A draft version of the staffing plan has been developed and delivered.) STATUS: Open. Due Date: 06/12/92

06/12/92 [Tom Goff, Carroll Hood] Develop separate detailed schedules using Microsoft Project for Level-1A and -1B software design and development. (Updated results have been obtained. They are being refined and adjusted for consistency with the master schedule.) STATUS: Open. Due Date: 07/10/92

07/31/92 [Ed Masuoka] Implement SLIP on the Sun 670. (Waiting on addresses from Code 930.) STATUS: Open. Due Date: 08/28/92

07/31/92 [Tom Goff, Ed Masuoka, Al Fleig] Develop the purpose and requirements for a packet simulator. Get more information on the packet simulator being developed by SBRC. (An updated requirements specification was included in the handout on 09/04/92. Further work is awaiting a plan for prototyping MODIS software.) STATUS: Open. Due Date: 09/04/92

08/21/92 [Paul Hubanks] Check to see what existing geolocation and pixel navigation software is available, and what EOSDIS plans to provide. (A report was included in the handout on 09/04/92.) STATUS: Open. Due Date: 09/04/92

MODIS Airborne Simulator (MAS) Status

Liam E. Gumley
Progress up to 10 September 1992

(1) Data processing

Processing of the MAS FIRE and ASTEX datasets is currently on hold while the final set of visible/near-IR calibration coefficients is being determined. Tom Arnold is waiting on a response from Pat Grant at Ames on the visible channel gain settings used during the cold chamber tests. These values are necessary for Tom to determine the visible/near-IR temperature sensitivity correction.

This week the calibration data from FIRE was processed. This data is not navigated and the calibration is just a slope of 1.0 and intercept of 0.0, so that the raw counts are stored in the output Level-1 netCDF file. The usual summary and quicklook data was generated and transferred to the MAS FTP site. A tape copy of the processed data will be handed to Tom Arnold on 09/11.

Chris Moeller asked me if I had done any noise estimates for the ASTEX data. For that reason, I updated my noise computation code and ran a test case for the 17 June data. I selected a region of 50x50 pixels where the MAS appeared to be viewing clear ocean. I then computed mean and standard deviation (RMS) values, and a signal to noise ratio defined as mean/RMS. I have emailed the results to Chris and expect to discuss them with him soon.

This week I received the rest of the ASTEX data from Ames. Brenda Colesanti has also copied more than half of the FIRE 9-track tapes to Exabyte 8500, and should be finishing the rest soon.

(2) Anonymous FTP site

I spent some time updating the anonymous FTP site currently located on ltpiris2. In order to assist users I installed compiled copies of the netCDF library for the following platforms:

- Silicon Graphics Iris (Irix 4.01),
- IBM PC (MSDOS 5.0, Microsoft FORTRAN 5.1, Microsoft C 6.0),
- DEC VAX (VMS 5.3).

This should enable a potential user to get netCDF up and running on his or her own platform with a minimum of effort. Also included for each platform are source and executable versions of the 'simple' MAS netCDF program I developed last week as a demonstration of how to access the flight line files, and an executable copy of ncdump for each platform. I have also begun to update the documentation available on the FTP site.

Flight Number ✓
Line Number ✓
Start Time ✓✓
End Time ✓✓
Duration ✓
Nominal heading ✓✓
Nominal altitude ✓✓
Nominal spatial resolution ✓
Number of scan lines ✓✓
Start scan line number ✓✓
End scan line number ✓✓
Nadir start latitude ✓✓
Nadir start longitude ✓✓
Nadir end latitude ✓✓
Nadir end longitude ✓✓
Nadir start solar zenith angle ✓✓
Nadir start solar azimuth angle ✓✓
Nadir end solar zenith angle ✓✓
Nadir end solar azimuth angle ✓✓
Day/night flag ✓
Land/water flag ?
Cloud/clear flag ?
Snow/clear flag ?
Nominal blackbody #1 reference temperature ✓✓
Nominal blackbody #2 reference temperature ✓✓
Browse/quick-look file name ✓
Level-0 tape ID
Level-1 tape ID
Location keyword
Comments (data quality, coverage features)

The three items marked with a '?' indicate metadata that could be generated automatically, but for which the method is not yet formulated. A land ocean percentage could probably be generated using a world topography dataset (source TBD). However generating cloud and snow percentages would be more difficult. As long as the percentage only needs to be accurate to around 10 percent, then a simple reflectance test for clouds would suffice. However more sophisticated techniques would need to be investigated for snow cover.

DRAFT

MODIS Level-2 Processing Shell Design and Development

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Date: September 7 - September 11, 1992

1. Algorithm Dependency Diagram

Al Fleig, Phil Ardanuy, Lloyd Carpenter, and I have prepared an alternative algorithm dependency diagram for the MODIS Science Team Leader. This alternative diagram is generated based on the discipline of each algorithm (i.e., group algorithms into ocean, atmospheric, and land applications), rather than the original products-driven style. A major feature in this alternative diagram is the close interconnection of the Water Leaving Radiance (Algorithm 545), Single Scattering Aerosol Radiances (Algorithm 555), and Angstrom Exponent (Algorithm 554).

Four data types are distinguished in this alternative diagram:

(1). Selected At-Launch product,
(2). Selected Post-Launch product,
(3). Non-Selected At-Launch product, and
(4). Non-Selected Post-Launch product.

These data types are used to flag inconsistencies in the current data processing scheme. This diagram will be revised as Team Members deliver their updated information to the Science Processing DataBase.

2. Shell Design and Development

One of the tasks in the shell development is to interface C and Fortran programs. I am examining the functions of CFORTRAN which is supposed to provide a completely transparent, machine independent interface between main program, subroutines, functions, and global data. I am also examining the calling interfaces and utilities provided by the Hierarchical Data Format (HDF) which was created at the National Center for Supercomputing Applications (NCSA).

Progress with Microsoft Project

Thomas E. Goff
NASA/GSFC/MODIS/SDST/RDC
10 September 1992

The MODIS ground system design effort can now be fully monitored via computer by using Microsoft Project version 3.0. This software program allows a fast response to "what if" questions which will arise as the design advances from the current preliminary stages to the final operational stage.

The design effort as currently implemented in MS Project consists on seven interrelated projects contained within eight interrelated disk files. A master project file is used to link together five subprojects: Level-1A Design, Level-1B Design, Utility Programs, Management, and Overhead. Additional subprojects to cover the Level-2 design or other efforts will be added in the future. These five projects contain all the design tasks, but share a common resource pool contained within a separate discrete subproject. This discrete subproject contains no tasks, but includes all the milestones that are relevant to the MODIS design effort. The final disk file contains a list of the other subproject files, enabling the suite of subprojects to be treated as a common workspace.

Resources required to perform a task, such as programmers, computers, COTS software, etc, can be shared across the various subprojects. Allocations of one or more occurrences of a resource can be assigned to each individual task within a subproject. For example, a programmer can be assigned writing a given section of the software that has been delineated as a separate task. This same programmer can also be assigned to other tasks from other subprojects, thereby creating a conflict in task resources. These can be balanced (leveled) by the MS-Project software to produce a resource allocation that is uniformly distributed across all tasks. This is performed by delaying the start of individual tasks, subject to several constraints. When this is performed on the MODIS design effort, an over allocation condition for the programmer exists. This can be alleviated by assigning more than one programmer to the resource pool.

Examples of resource constraints include software preliminary and critical design review dates and COTS software and hardware delivery dates. These milestones are included on the Milestone subproject list and are linked via the dynamic data exchange (DDE) mechanism to the constraint fields in the design subprojects. This allows constraints to be updated in one logical location and have their effect take place on the individual subproject task alignments.

Tasks within a subproject can be linked in a linear or branched sequence with other tasks. For example, the beta version structure chart completion can allow the preliminary requirements to be written, the scan geometry task to be started, and the version 1 structure charts task to be initiated. These dependencies (predecessors) are included on the Task Sheet for each subproject . The Task Sheet may also include a field with the successor task IDs. The two fields are the forward and backwards pointers illustrating the links among the tasks.

Resource leveling among the various subproject tasks takes into account the priority, linking, and type of linking when calculating the task delay required to accomplish the whole of the MODIS design effort. Resources do not have to be allocated as whole quantities (percentages are allowed), and the linking of tasks can be any combination of start / finish specifications, the start of a following task depending on the finish of the predecessor task being the most common.

The current project files contain most of the task dependency relationships that have been determined at the present time. An example of an area that needs to be corrected can be seen at the Level-1A task number 14. This is currently a 'dangling' task which MS-Project has delayed until launch. This will be modified to be a predecessor to a code creation task which will alter the conditions for the leveling process.

The task dependencies within the entire MODIS design effort now need to be resolved in a logical manner and the additional design tasks and subprojects added. This will result in a very useful tool for accessing the progress of the task while allowing flexibility for altering the subproject files as the design effort matures.